REMARKS

Pending claims 42-55 are rejected as obvious over the combination of Funk (U.S. Pat. 6,168,884) and Kleider (U.S. Pat. 6,084,919). The core rejection argument is that Funk teaches modifying transmit power or transmit data rate, but not both, responsive to thermistor-based temperature sensing, and that it would have been obvious to incorporate into Funk the teachings from Kleider that disclose the adjustment of both transmit power and transmit data rate.

As a first point, Applicant notes that Kleider includes no teachings related to transmitter temperature sensing, nor even any mention that temperature can be considered when adjusting transmission parameters. Instead, Kleider discloses a transmitter that adapts transmission parameters based on the spectral profile of a channel, which may be updated to reflect changing channel conditions. Given that Kleider has absolutely nothing to do with Funk's temperature-related teachings, it is apparent that Kleider is used in combination with Funk merely for its mention that data rate and power are among the transmit parameters that can be adapted for a given channel's spectral profile, and not because Kleider has any real relevance to the teachings of Funk.

The lack of relevance between the teachings of Kleider and Funk demonstrates the conclusory and unsupported nature of the examiner's stated basis for finding the combination of Funk and Kleider obvious. Specifically, the examiner states that:

> Thus it would have been obvious to a person skilled in the art to incorporate the concept of selectively modifying a transmit power level and a transmission data rate (transmission parameters) associated with transmitting data from a transceiver as disclosed by Kleider into the method and apparatus for reducing power in radio transmitters as disclosed by Funk, in order to efficiently improve system performance by varying a combination of transmit parameters.

The actual teachings of Funk do not support the above statements; indeed, the actual teachings of Funk contradict the above statements and provide clear evidence that the Patent Office has not carried its burden of establishing a *prima facie* case for obviousness.

Fundamentally, Funk's teachings relate to monitoring the temperature of a mobile radio device and reducing transmit power if the temperature of the device exceeds a threshold. See Funk, Summary. The Summary of Funk and elsewhere in Funk teach that an alternative approach to temperature reduction involves the insertion of brief transmission pauses, during which time the transmitter is turned off. The Summary of Funk teaches that such pauses, which effectively reduce the transmit "duty cycle," are short enough to avoid loss of the radio connection. Funk details transmission pausing at col. 4, lines 29-60. There, Funk teaches that the transmission pauses are introduced for the Supervisory Audio Tone (SAT) signal transmitted by an Advanced Mobile Phone System (AMPS) device. Funk discloses that the SAT signal normally is a continuous tone transmitted by an AMPS device, and that the temperature of an AMPS transmitter can be reduced by briefly suspending (pausing) SAT signal transmission for time instances shorter than the SAT time-out.

For the record, Funk's detailed teachings are that transmit pauses are done only when the host device (e.g., a computer hosting a mobile radio device) is receiving rather than transmitting. See Funk in its Abstract (second to last sentence); col. 2, lines 53-57; col. 4, lines 48-60; and independent claims 1 and 9, which stipulate pausing only during receive mode. Such teachings make sense in the CDPD/AMPS context of Funk, wherein a transceiver continuously transmits a SAT, even when it is receiving. The SAT is not a data signal rather it is a tone that can be monitored for presence at the remote end. It is clear from Funk that pausing SAT transmission by a mobile radio device while its host device or system is in a receive mode cannot under any stretch of logic be understood as the mobile radio device changing its data transmission rate. Put simply, in the receive mode, Funk's mobile radio device is not transmitting any data and by definition cannot modify data transmission rates.

Thus, Funk never discloses changing transmit data rates as a mechanism to influence transmitter temperature, and no one skilled in the art would understand Funk's teachings

regarding interruption of SAT signal transmission as varying a transmit data rate. It is inaccurate and unsupported by the record evidence in the instant application for the examiner to state that "Funk however discloses modifying a transmission power <u>or</u> modifying the transmission data rate as agreed upon by the applicant (see remarks page 2)." In the remarks referred to by the examiner—submitted on 7 Jan. 2008 in support of the pre-appeal brief request for review—Applicant explicitly stated:

> Contrary to the examiner's assertions, nothing in Funk teaches or suggests modifying a transmission data rate based on a measured temperature. Instead, Funk teaches changing the duty cycle of a non-data signal, such as an SAT (Supervisory Audio Tone) signal, based on a measured temperature. As well understood by those skilled in the art, "data rate" represents the number of bits conveyed or processed in a unit of time (http://en.wikipedia.org/wiki/Bit_rate). Contrastingly, "duty cycle" represents the proportion of time during which a component, device or system is operated (http://en.wikipedia.org/wiki/Duty_cycle). <u>Because duty cycle is not the same as data rate, the duty cycle modification taught by Funk cannot be construed as equivalent to the claimed data rate modification of claims 42 and 53. Further, nothing in Funk teaches or suggests modifying the transmit power level AND the transmission data rate based on a measured temperature. Instead, Funk explicitly teaches modifying a transmission power OR modifying a duty cycle of a non-data signal</u>. See col. 4, ll. 32 – 33.

(Emphasis added.) The erroneous characterization of Applicant's prior comments is apparent from the record. Applicant did not then and does not now agree that Funk teaches modifying transmit power or modifying transmit data rate. As is clear from the record and the plain teachings of Funk, Funk teaches modifying transmit power level or modifying transmit duty cycle (on an otherwise continuous SAT signal) as a basis for lowering transmitter temperature.

Regarding independent claim 42 as an example, Funk's teachings regarding modification of transmit duty cycle are not the same as the claimed limitation of "selectively modify[ing] a transmit power level and a transmission data rate associated with transmitting the data from said transceiver based on said comparison." Thus, it is not a question of comparing an "or" operation in Funk (power level <u>or</u> data rate) with an "and" operation in the claims at issue (power level <u>and</u> data rate); Funk simply does not teach data rate adjustment as a basis for

controlling transmitter temperature. No one skilled in the art would understand Funk's teaching that an otherwise continuous SAT signal can be paused for short periods of time as relating in any way to controlling the transmit data rate of a transmitter.

Thus, the assertion on p. 3 of the Office Action that Funk discloses modifying transmit power or modifying transmit data rate is plain error. This factual error means that the examiner has not fulfilled the first step in a legally proper "Graham" inquiry into obviousness, wherein the examiner is obligated to make factual determinations regarding the teachings of the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). That factual error also means that the examiner has not made an accurate comparison between the claimed invention and the actual teachings of the prior art, which is the second step in a proper Graham inquiry.

Again, Funk is missing any teachings regarding the modification of transmit data rate as a basis for controlling transmitter temperature, and it is error for the examiner to argue that Funk provides such teachings. It is notable that the controlling decision by the United States Supreme Court, *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 82 U.S.P.Q.2d 1385 (2007), emphasizes the importance of the Graham factual inquiries in determining whether a claim is obvious. Indeed, the Court emphasizes that the controlling analysis for obviousness involves determining the scope and content of the prior art and ascertaining the differences between the prior art and the claims at issue. *Id* at 1760.

With the above in mind, the incompatibility of Kleider and Funk is apparent, as is the contrived nature of the proffered reason for why it would have been obvious to combine Kleider with Funk. Particularly, the examiner states that one of ordinary skill in the art would have found the combination obvious "...in order to efficiently improve system performance by varying a combination of transmit parameters." The examiner's argued-for combination of transmit parameters is transmit power level and transmit data rate. But, as Applicant has demonstrated in the above analysis, Funk's teachings regarding transmit pausing are, in every detailed

example given in Funk, related to pausing an SAT signal during times when Funk's mobile radio device is receiving data rather than transmitting data.

Further, as disclosed in the CDPD System Specification, Release 1.1 (Copyright 1995, CDPD Forum, Inc.), it appears that data transmission in CDPD systems like those described in Funk used a fixed, 19.2 Kbps channel. See Section 4.5 on p. 401-9 of the attached section of the CDPD specification. If, as appears to be the case, the CDPD systems of interest in Funk did not support variable data rate transmissions, then it is unsupported for the examiner to argue that one skilled in the art would understand Kleider as offering any meaningful teachings regarding Funk. In other words, if the data transmission systems of interest in Funk (AMPS overlaid with CDPD) did not support variable data rate transmissions, then it is not obvious to modify Funk to include data rate variability for any purpose, much less that purpose at issue in the rejected claims.

For at least the above reasons, Applicant submits that the obviousness rejections of claims 42-55, including independent claims 42 and 53, fail as a matter of law and must be withdrawn. Applicant believes that all pending claims stand in condition for allowance and respectfully requests an indication as such by the examiner.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

Dated: 1 August 2008

Michael D. Murphy
Registration No.: 44,958

1400 Crescent Green, Suite 300
Cary, NC 27518
Telephone: (919) 854-1844
Facsimile: (919) 854-2084

PART 401

Airlink Physical Layer

1 Introduction

This Part defines the Physical Layer of the Airlink Interface between the Mobile Data Base Station (MDBS) and the Mobile End Systems (M-ESs).

Minimum performance requirements for MDBSs and M-ESs wishing to use this interface are defined in Part 408 and Part 409.

The Physical Layer is modelled on the requirements for cellular operation specified in EIA standards [EIA/IS-19], [EIA/IS-20], [EIA/TIA-54], [EIA/TIA-55], [EIA/TIA-56] and [EIA/TIA-553].

2 Overview

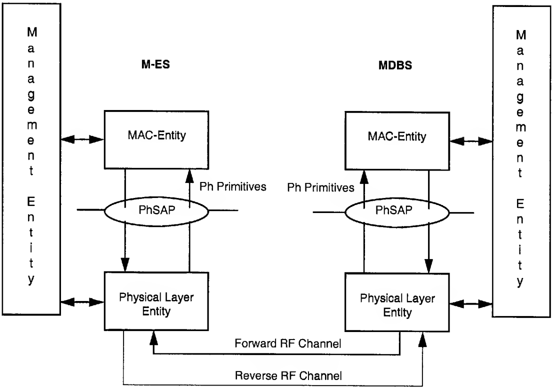
The Physical Layer accepts a sequence of bits from the Medium Access Control (MAC) Layer and transforms them into a modulated waveform for transmission to the remote end. The Physical Layer also receives a modulated waveform from the remote end which it transforms into a sequence of received bits for delivery to the MAC layer.

The Physical Layer also provides the ability to tune to a specific RF channel, to measure the Received Signal Strength Indication (RSSI) of the received signal, and set the transmission power of the transmitted signal to a specified level.

2.1 Model of Operation

The operation of the Physical Layer is modelled on the abstractions defined in [CCITT-X.200]. The application of this model to the Physical Layer is shown in Figure 401-1.

FIGURE 401-1 **Physical Layer: X.200 Reference Model**



Communication takes place between two active elements, such as modems, which are modelled as Physical Layer Entities (Ph-Entities). The Ph-Entities are driven by users, for example, DSP processors implementing the MAC layer protocol defined in Part 402, which are modelled as MAC Entities. In addition, the active element responsible for configuration and management of a Ph-Entity is modelled as a *Management Entity*.

Peer-to-peer communications between Ph-Entities takes place over a pair of RF channels. Transmissions from the MDBS Ph-Entity to the M-ES Ph-Entity are sent over the forward RF channel. Transmissions from the M-ES Ph-Entity to the MDBS Ph-Entity are sent over the reverse RF channel.

There is precisely one MAC-Entity and one Ph-Entity in each M-ES or MDBS for each pair of RF channels. However, the transmissions of a single MDBS Ph-Entity are received by all M-ES Ph-Entities on the same RF channel pair. Interactions between each Ph-Entity and its associated MAC-Entity occur across an interface, the Ph-Interface. These interactions take place through a Physical Service Access Point (PhSAP). There is precisely one PhSAP for each Ph-Entity. There is no identification required for the Ph-Entity. There is no identification required for the PhSAP.

An MDBS shall provide one Ph-Entity for each pair of RF channels supported simultaneously. For each Ph-Entity there shall be one corresponding MAC-Entity and one corresponding Link-Entity. The means by which an MDBS Management-Entity distinguishes between different Ph-Entities shall be implementation dependent.

Interactions between the MAC-Entity and the Ph-Entity are modelled by the definition of abstract primitives and associated parameters. The set of primitives supported across the Ph-Interface defines the set of services provided by the Physical Layer. The set of interactions required between Ph-Entities defines the Physical Layer Protocol.

Data is transferred across the Ph-Interface in Physical Service Data Units (PhSDUs), which correspond to individual bits.

2.2 Physical Layer Characteristics

The basic function provided by the Physical Layer is to transmit a sequence of bits as a modulated waveform. The RF channel over which this is done is one of the 30 kHz RF channels provided for use by cellular telephone transmissions in specification [EIA/TIA-553]. Communications between the MDBS and the M-ES take place over a pair of such RF channels, the pairing conforming to the rules laid down in [EIA/TIA-553]. RF channels used as AMPS control channels shall not be used for CDPD.

The data transmissions make use of Gaussian Filtered Minimum Shift Keying (GMSK) modulation[1] at a data rate of 19.2 kbps.

The transmissions take place at a power level consistent with the power classes defined by specifications [EIA/TIA-54], [EIA/TIA-55] and [EIA/TIA-56]. The received signal strength shall be measured by both the MDBS and the M-ES to determine whether the M-ES is transmitting at the most appropriate power level.

1. See K. Murota & K. Hirade: "GMSK Modulation for Digital Mobile Radio Telephony," *IEEE Trans. Comm.*, vol. COM-29, pp 1044-1050, July 1981.

3 Services Provided by Physical Layer

The Physical Layer provides the following services to the MAC layer:

- The ability to tune to a specified pair of RF channels for transmission and reception of bits between the M-ES and the MDBS
- The ability to transmit and receive bits between the M-ES and the MDBS across the pair of RF channels
- The ability to set the power level to be used for transmission of bits between the M-ES and the MDBS
- The ability to measure the signal level of received bits at the M-ES and the MDBS
- The ability to suspend and resume monitoring of RF channels in the M-ES in support of measures taken to conserve battery power.

The primitives used to provide service across the physical user and management interfaces are defined in the remainder of this section. They are summarized in Table 401-1.

TABLE 401-1 **Summary of Physical Interface Primitives**

Primitive	M-ES Parameters	Mandatory/ Optional	MDBS Parameters	Mandatory/ Optional
Ph-OPEN.request	RF Channel Number	M	RF Channel Number	M
Ph-CLOSE.request	-	-	-	-
Ph-DATA.request	Bit	M	Bit	M
Ph-DATA.indication	Bit	M	Bit	M
Ph-POWER.request	Power Level	M	Power Level	M
Ph-RSSI.indication	RSSI	M	RSSI	M
Ph-SLEEP.request	-	-	NOT APPLICABLE	
Ph-WAKE.request	-	-		

3.1 RF Channel Management

The following primitives are used by the Management Entity to control access to RF channels:

- *Ph-OPEN.request*, invoked to tune away from the current RF channel to a new RF channel. This primitive has one associated mandatory parameter, the RF Channel Number of the RF channel pair being opened.
- *Ph-CLOSE.request*, supplied to disable the transmitter of the M-ES or the transmitter and receiver of the MDBS. After invocation of a *Ph-CLOSE.request*, the MAC-Entity is not able to send data.

There are no associated parameters.

3.2 Data Transfer

The following primitives are used by the MAC-Entity to transfer data:[2]

- *Ph-DATA.request*, invoked by the sender of data. A *Ph-DATA.request* may only be issued between the invocation of a *Ph-OPEN.request* and a *Ph-CLOSE.request*. The M-ES Ph-Entity shall commence the rampup of transmission power on receipt of the first *Ph-DATA.request* in a burst. The M-ES Ph-Entity shall commence the rampdown of transmission power after the last *Ph-DATA.request* in a burst.

  This primitive has one associated mandatory parameter, the BIT being transmitted.
- *Ph-DATA.indication*, delivered to the receiver of data.

  This primitive has one associated mandatory parameter, the BIT being received.

3.3 Power Primitives

The following primitives provide the Management Entity with the ability to control the transmission power of the M-ES or MDBS:

- *Ph-POWER.request*. This primitive allows the Management-Entity to set the transmit power level. It has one mandatory parameter, the POWER LEVEL to which the transmission power shall be set. The power level in the M-ES shall be a level selected from the levels specified in [EIA/TIA-54] and [EIA/TIA-55]. The power level in the MDBS shall be specified according to the procedures in [EIA/TIA-56].

  The procedures for determining the power levels are defined in Part 405. The power level of an M-ES shall be constant between the issuance of a *Ph-OPEN.request* and a *Ph-CLOSE.request*. The power level of an MDBS shall be held constant unless changed by the Network Management System (NMS).
- *Ph-RSSI.indication*. This primitive notifies the Management Entity of the signal strength of the received waveform. It is supplied to the Management-Entity in accordance with the procedures defined in Part 405.

2. Although the PhSAP interface is modelled as a digital bit stream, such an interface is not intended to constrain possible implementations in any way. In particular, additional information regarding bit timing recovery or reliability of bit decoding may provide for superior implementations of synchronization or block error decoding procedures.

This primitive has one mandatory parameter, RSSI, which shall give the received signal strength.

- *Ph-SLEEP.request.* This primitive allows the Management-Entity in the M-ES to instruct the Ph-Entity to enter battery conservation mode. There are no associated parameters.
- *Ph-WAKE.request.* This primitive allows the Management-Entity in the M-ES to instruct the Ph-Entity to leave battery conservation mode. There are no associated parameters.

4 Encoding

This section defines the structure of the RF channel and the encoding of PhPDUs in the Physical Layer.

4.1 RF Frequency

The forward and reverse RF channel spacing shall be 30 kHz RF channels that shall be chosen from the range of RF channels 1 to 1023 assigned for transmit and receive use by land stations in specification [EIA/TIA-553]. RF channels 800 through 990 inclusive are not allocated for cellular use or are not used. RF channels 313 through 354 inclusive, RF channels 688 through 708 inclusive, and RF channels 737 through 757 inclusive are designated as control channels in specification [EIA/TIA-54].

The numbering of RF channels shall conform to the conventions specified in [EIA/TIA-553]. RF channels shall be grouped as System A or System B according to the rules specified in [EIA/TIA-553]. RF channels shall be termed basic or extended RF channels according to the rules specified in [EIA/TIA-553].

A forward RF channel shall be paired with a reverse RF channel at all times. The relationship between the two RF channels shall conform to the relationship between land station transmit RF channels and mobile station transmit RF channels specified in [EIA/TIA-553].

4.2 Power Output Characteristics

The power output characteristics for MDBS transmissions on the forward RF channel are different from the power output characteristics of M-ES transmissions on the reverse RF channels.

4.2.1 Forward RF Channel (MDBS)

4.2.1.1 Steady State

Data on the forward RF channel shall be transmitted at a fixed power level while the forward RF channel is in use for CDPD. The power level shall be coordinated locally on an ongoing basis. The power level shall be determined by the NMS.

4.2.1.2 Rampup and Rampdown

On powerup of the MDBS or after completion of an RF channel hop, the MDBS shall commence transmission on the forward RF channel with a maximum power rampup time of 2 milliseconds. Rampup shall commence upon receipt of the first *Ph-DATA.request* primitive after the MDBS has opened the RF channel. The first bit of the Reed-Solomon block shall be transmitted after completion of the rampup period.

On powerdown of the MDBS or at the commencement of an RF channel hop, the MDBS shall rampdown its power over a maximum period of 2 milliseconds.

Rampup shall be completed before the transmission of any bit on the forward RF channel. Rampdown shall commence immediately following the transmission of the final bit on the forward RF channel.

4.2.2 Reverse RF Channel (M-ES)

4.2.2.1 Steady State

Data on the reverse RF channel shall be transmitted at a fixed power level during a given burst. The power level shall be determined by the M-ES Management Entity prior to the start of the burst, using the procedures defined in Part 405. The power level shall be one of the power levels defined for use by mobile stations in [EIA/TIA-55], as reproduced in Table 401-2.

TABLE 401-2 **M-ES Nominal Power Levels**

M-ES Power Level (PL)	Nominal ERP for M-ES Power Class (dBW)			
	I	II	III	IV
0	6	2	-2	-2
1	2	2	-2	-2
2	-2	-2	-2	-2
3	-6	-6	-6	-6
4	-10	-10	-10	-10
5	-14	-14	-14	-14
6	-18	-18	-18	-18
7	-22	-22	-22	-22
8	-22	-22	-22	-26±3 dB
9	-22	-22	-22	-30±6 dB
10	-22	-22	-22	-34±9 dB

4.2.2.2 Rampup and Rampdown

A reverse RF channel transmission burst shall be initiated by a power rampup period of 2 milliseconds (38 bit times), commencing with the transmission of the first bit in the burst. Rampup shall commence upon receipt of the first *Ph-DATA.request* primitive after the M-ES has opened the RF channel. The first bit of the 38-bit dotting sequence shall be transmitted at the start of the rampup period.

Following transmission of the final bit in the burst, the M-ES MAC-Entity shall issue a *Ph-CLOSE.request.* The M-ES shall then rampdown over a period not exceeding 2 milliseconds. The carrier shall be modulated with a binary 0 during the rampdown.

4.3 Duty Cycle

The duty cycle for MDBS transmissions on the forward RF channel is different from the duty cycle for M-ES transmissions on the reverse RF channel.

4.3.1 Forward RF Channel (MDBS)

Transmission on the forward RF channel shall be continuous while the forward RF channel is in use for CDPD. A forward RF channel may be dedicated for CDPD use or it may be shared, as a non-dedicated RF channel, with other cellular transmissions on a time-division basis.

If the RF channel is a non-dedicated RF channel, then the other users of the RF channel shall have access priority over CDPD. If other activity is detected by the MDBS, then the MDBS shall initiate an RF channel hop to another RF channel which is not currently in use, if there is an RF channel available, following the procedures of Part 405.

If the RF channel is shared with other cellular transmissions, then the MDBS shall relinquish the RF channel after a period of time MAX_CHANNEL_TIME, which shall be configurable with a default value of one minute, even if no other activity has been detected on the channel. See Part 405 for further details.

4.3.2 Reverse RF Channel

Transmission on the reverse RF channel shall be continuous while the reverse RF channel is in use by a particular M-ES. An M-ES transmission shall be limited in duration according to the procedures defined in Part 402. Access to the reverse channel is shared between different M-ESs and is arbitrated by the MDBS. The procedures for determining the period during which an RF channel may be accessed by a particular M-ES are defined in Part 402.

4.4 Modulation

During the duty cycle on both the forward and reverse RF channels, data shall be modulated using GMSK modulation with $B_bT=0.5$. The modulation index shall be h=0.50.

An RF channel symbol shall represent a bit value of 1 if the instantaneous frequency is greater than the central carrier frequency and zero if the instantaneous frequency is less than the central carrier frequency.

4.5 Bit Transmission Rates

Bit transmissions on both the forward and reverse RF channels shall be at a bit rate of 19.2 kbps.